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10/568,946	02/21/2006	Elena Costa	14541678	8554

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EXAMINER	
STEVENS, BRIAN J	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,946	COSTA ET AL.	
	Examiner	Art Unit	
	Brian J. Stevens	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-18 and 21-24* is/are rejected.

7)☒ Claim(s) *19 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed on May 23rd, 2008 and February 21st, 2008 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Allowable Subject Matter

2. Claims 19 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 13, 21, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2005/0018791 A1 by Molisch et al., in view of US 2004/0097238 A1 by Hwang et al., in further view of US 2003/0027522 A1 by Valdivia et al.

5. Regarding claim 13, Molisch teaches a method for allocating radio communication resources in radio cells of a cellular radio communication system having a plurality of user stations and network units, comprising:

dividing a frequency band (See Figure 2, [202]) into a plurality of sub-carriers (See Figure 2, Subband N A and B, Subband N-1 A and B, and Subband N-2 A and B) used in the radio communication system for communication purposes (See Paragraph [0003], “A number of possible modulation/multiple access schemes are considered for a physical layer of an ultra wide bandwidth (UWB) communications system by the IEEE 802.15.3a standards working group”), by dividing the frequency band into a number of sub- bands (See Figure 2, Subband N, Subband N-1 and Subband N-2), each sub-band including at least one sub-carrier (See Figure 2, where each Subband has at least one sub-carrier, specifically 2, A and B), but does not teach so that the number of the sub-bands is different in at least two of the radio cells;

dividing the user stations into a number of groups; and

allocating each group of the user stations to one of the sub-bands for communication.

Hwang teaches the knowledge of dividing the user stations (See Paragraph [0024], “If a predetermined condition is satisfied, the BS establishes a channel with the MS by assigning a first OFDM frequency resource to the MS. If the MS is outside of the near cell area, the BS establishes a channel with the MS by assigning a second OFDM frequency resource to the MS”) in a number of groups (See Abstract, "into at least four frequency groups”), is well known in the art. Hwang further teaches allocating each

group of the user stations to one of the sub-bands for communication (See Abstract, "The frequency groups are sequentially assigned to cell areas of each BS such that lower frequency groups are available to a near cell area and higher frequency resource groups are available to a remote cell area", where each MS is determined to fall within a certain area, thus allocating each group of MS to one of the sub-bands), is well known in the art.

Valdivia teaches the knowledge of having a different amount of sub-bands in different radio cells/base stations (See Paragraph [0068], "each cell has different number of subbands allocated to it based on the volume of satellite resources needed in that particular geographic cell"), is well known in the art.

6. It would have been obvious to one of ordinary skill in the art having the teachings of Molisch, Hwang and Valdivia before them at the time the invention was made, to modify the method of Molisch to further include having the number of the sub-bands is different in at least two of the radio cells; dividing the user stations into a number of groups; and allocating each group of the user stations to one of the sub-bands for communication. Through the use of having a different number of sub-bands in each cell would make it possible to allocate valuable bandwidth more effectively, rather then having a set way of allocation per cell. Secondly through the use dividing the stations into groups and assigning each group to a specific sub band so that lower frequency groups are available to a near cell area and higher frequency resource groups are available to a remote cell area, thus improving reception. One of ordinary skill in the art would therefore have been motivated to make the modification to further include the

number of the sub-bands is different in at least two of the radio cells; dividing the user stations into a number of groups; and allocating each group of the user stations to one of the sub-bands for communication.

7. Regarding claim 21, Molisch together with Hwang and Valdivia taught the method according to claim 13, as described above. Hwang further teaches the knowledge of after said allocating of each group to the one of the sub-bands, spreading data using codes on at least some sub-carriers of the one of the sub-bands (See Paragraph [0005], "The 3G mobile communication systems are categorized into synchronous code division multiple access (CDMA) and asynchronous CDMA", where CDMA is sending all the data with spreading codes, thus fulfilling the limitation of at least some).

8. Regarding claim 23, Molisch together with Hwang and Valdivia taught the method according to claim 13, as described above, the same rationale of rejections is applicable, wherein the network modules further comprise the modules for performing respective functions/steps discussed therein, the same rationale of rejections is applicable.

9. Regarding claim 24, Molisch together with Hwang and Valdivia taught the method according to claim 13, as described above, the same rationale of rejections is applicable, wherein the computer readable medium program further comprises the

modules for performing respective functions/steps discussed therein, the same rationale of rejections is applicable.

10. Claims 14-18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2005/0018791 A1 by Molisch et al., in view of US 2004/0097238 A1 by Hwang et al., in further view of US 2003/0027522 A1 by Valdivia et al., in further view of US 2004/0179627 A1 by Ketchum et al.

11. Regarding claim 14, Molisch together with Hwang and Valdivia taught the method according to claim 1, as described above, but do no teach further comprising determining the number of sub-bands depending on transmission conditions in each of the at least two radio cells.

Ketchum teaches the knowledge of determining the number of sub-bands depending on transmission conditions (See Paragraph [0199], "number of subbands to include in each set may be dependent on the SNR") in each of at least two radio cells (See Paragraph [0200], "which can improve the efficiency of the system", the system being Figure 1, where [110b] being one cell and [110a] being the second).

12. It would have been obvious to one of ordinary skill in the art having the teachings of Molisch, Hwang, Valdivia and Ketchum before them at the time the invention was made, to modify the method of Molisch, Hwang and Valdivia to further include having determining the number of sub-bands depending on transmission conditions in each of the at least two radio cells. Since Valdivia teaches the knowledge of having different sub-bands per cell, and they are assigned by "the number of demanded subbands",

(See Paragraph [0047]), determining how many is "demanded" by would be obvious to try by the transmission condition, since there are a finite amount of way to determine how they are demanded. One of ordinary skill in the art would therefore have been motivated to make the modification to further include determining the number of sub-bands depending on transmission conditions in each of the at least two radio cells.

13. Regarding claim 15, Molisch together with Hwang, Valdivia and Ketchum taught the method according to claim 14, as described above. Ketchum further teaches wherein the transmission conditions are transmission capacities (See Paragraph [0199], "number of subbands to include in each set may be dependent on the SNR") of the at least one sub-carrier in each of the radio cells. (See Paragraph [0200], "which can improve the efficiency of the system", the system being Figure 1, where [110b] being one cell and [110a] being the second).

14. Regarding claim 16, Molisch together with Hwang, Valdivia and Ketchum taught the method according to claim 15, as described above. Ketchum further teaches further comprising determining the transmission conditions (See paragraph [0006], "Consequently, the transmitted RF modulated signals may experience different channel conditions (e.g., different fading and multipath effects) and may be associated with different complex gains and signal-to-noise ratios (SNRs)") by at least one of at least one user station and at least one network unit (See Paragraph [0009], "it is desirable to minimize pilot transmission to the extent possible. Moreover, if the MIMO system is a

multiple-access system that supports communication with multiple users") based on measured signal-to-noise ratios (See Paragraph [0199], "number of subbands to include in each set may be dependent on the SNR", also).

15. Regarding claim 17, Molisch together with Hwang and Valdivia taught the method according to claim 13, as described above, but do not teach wherein said determining of the number of sub-bands for each of the at least two radio cells takes into consideration data transmission made possible subsequently by said dividing of the frequency band into sub-bands, said dividing of the user stations into groups and said allocating of each group to the one of the sub-bands.

Ketchum teaches the knowledge of determining the number of sub-bands of the at least two radio cells (See Paragraph [0200], "which can improve the efficiency of the system", the system being Figure 1, where [110b] being one cell and [110a] being the second) by taking into consideration data transmission (See Paragraph [0199], "number of subbands to include in each set may be dependent on the SNR").

Hwang teaches, as stated above, the knowledge of dividing the user stations (See Paragraph [0024], "If a predetermined condition is satisfied, the BS establishes a channel with the MS by assigning a first OFDM frequency resource to the MS. If the MS is outside of the near cell area, the BS establishes a channel with the MS by assigning a second OFDM frequency resource to the MS") in a number of groups (See Abstract, "into at least four frequency groups"), is well known in the art. Hwang further teaches allocating each group of the user stations to one of the sub-bands for communication

(See Abstract, "The frequency groups are sequentially assigned to cell areas of each BS such that lower frequency groups are available to a near cell area and higher frequency resource groups are available to a remote cell area", where each MS is determined to fall within a certain area, thus allocating each group of MS to one of the sub-bands).

16. It would have been obvious to one of ordinary skill in the art having the teachings of Molisch, Hwang, Valdivia and Ketchum before them at the time the invention was made, to modify the method of Molisch, Hwang and Valdivia to further include having determining of the number of sub-bands for each of the at least two radio cells takes into consideration data transmission made possible subsequently by said dividing of the frequency band into sub-bands, said dividing of the user stations into groups and said allocating of each group to the one of the sub-bands. Since Valdivia teaches the knowledge of having different sub-bands per cell, and they are assigned by "the number of demanded subbands", (See Paragraph [0047]), determining how many is "demanded" by would be obvious to try by the transmission condition, since there are a finite amount of way to determine how they are demanded. One of ordinary skill in the art would therefore have been motivated to make the modification to further include determining the number of sub-bands of the at least two radio cells by taking into consideration data transmission.

17. Regarding claim 18, Molisch together with Hwang and Valdivia taught the method according to claim 13, as described above, but do not teach wherein said

dividing into the sub-bands and the groups and said allocating of each group to the one of the sub-bands comprises in order to increase transmission capacity:

starting from the transmission capacity of an initial constellation of said dividing into the sub-bands and the groups and said allocating of each group to the one of the sub-bands; and

calculating the transmission capacity of a modified constellation of said dividing into the sub-bands and the groups and said allocating of each group to the one of the sub-bands.

Ketchum teaches the knowledge of starting with an initial transmission with a certain transmission capacity, SNR, based upon the way sub-bands are distributed (See Paragraph [0199], "the number of subbands to include in each set may be dependent on the SNR", where in order change the number of subbands in each set, and SNR has to be taken after an initial transmission), then modify the sub-bands and calculating the transmission capacity, SNR, (See Paragraph [0199], "the number of subbands to include in each set may be dependent on the SNR", where the sub-bands are redistributed based upon the SNR, thus being calculated) is well known in the art.

18. It would have been obvious to one of ordinary skill in the art having the teachings of Molisch, Hwang, Valdivia and Ketchum before them at the time the invention was made, to modify the method of Molisch, Hwang and Valdivia to further include starting from the transmission capacity of an initial constellation of said dividing into the sub-bands and the groups and said allocating of each group to the one of the sub-bands; and calculating the transmission capacity of a modified constellation of said dividing into

the sub-bands and the groups and said allocating of each group to the one of the sub-bands. In order to increase the transmission capacity of any type of transmission a readings must be taken from a first transmission in order to determine what needs to be corrected. Through the use of finding the SNR, can determine how the sub-bands needs to be re distributed, thus improving the transmission capacity. One of ordinary skill in the art would therefore have been motivated to make the modification to further include starting with an initial transmission with a certain transmission capacity, SNR, based upon the way sub-bands are distributed, then modify the sub-bands and calculating the transmission capacity, SNR.

19. Regarding claim 22, Molisch together with Hwang and Valdivia taught the method according to claim 13, as described above, but do not teach wherein signals transmitted after said allocating of each group to the one of the sub-bands on at least partly same sub-carriers, can be distinguished from each other by spatial propagation thereof.

Ketchum teaches the knowledge of using spatial propagation to distinguish each signal received by the receiver that have been transmitted by the transmitter (See Paragraph [0007], “The channel response may also be needed by the receiver to perform spatial processing on the received signals to recover the transmitted data”), is well known in the art.

20. It would have been obvious to one of ordinary skill in the art having the teachings of Molisch, Hwang, Valdivia and Ketchum before them at the time the invention was

made, to modify the method of Molisch, Hwang and Valdivia to further include having signals transmitted after said allocating of each group to the one of the sub-bands on at least partly same sub-carriers, can be distinguished from each other by spatial propagation thereof. Since signals are being sent by more then one transmitter/base station, spatial propagation would have to be taken into consideration due to multi path fading and other types of transmission effects in order to determine the data being transmitted. One of ordinary skill in the art would therefore have been motivated to make the modification to further include using spatial propagation to distinguish each signal received by the receiver that have been transmitted by the transmitter.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Stevens whose telephone number is (571)270-3623. The examiner can normally be reached on M-F 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BS
/Brian J. Stevens/

/David C. Payne/

Supervisory Patent Examiner, Art Unit 2611